



# The Cell in its Environment

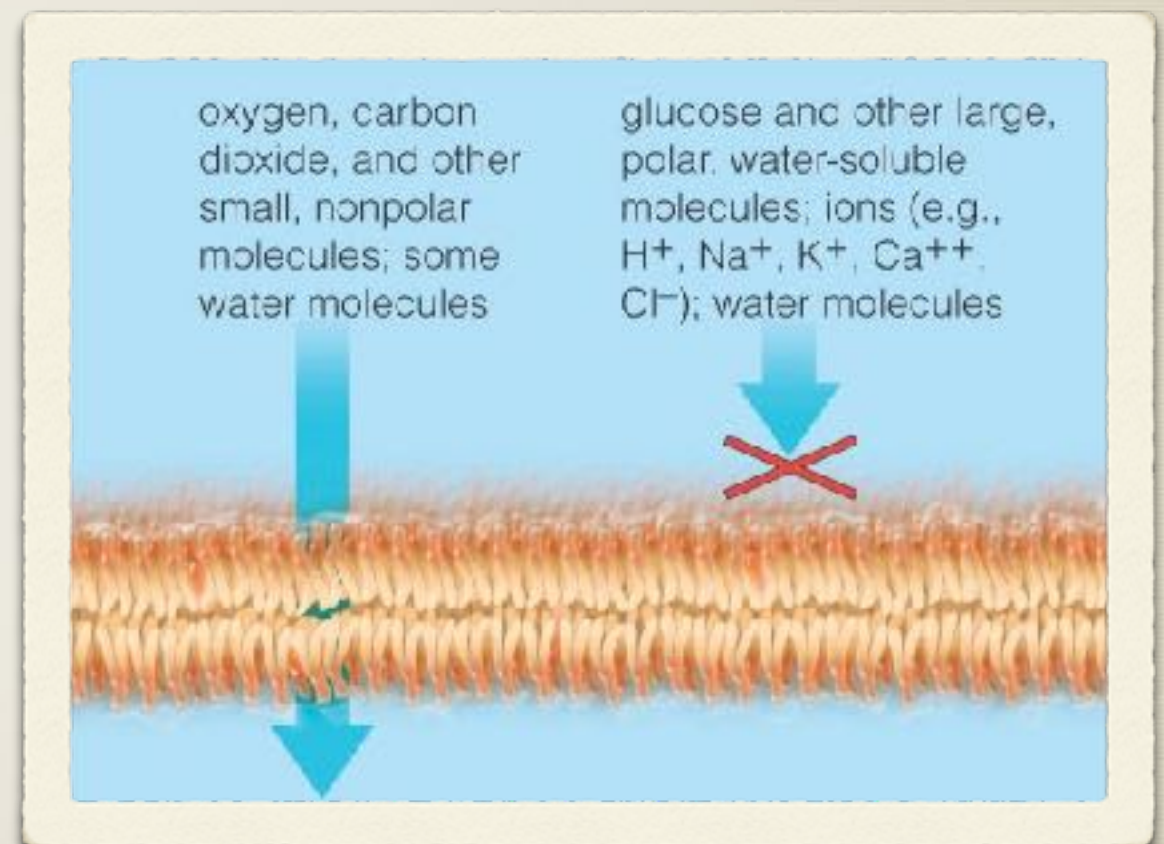
How things move in cells



# The Cell's Environment

The cell membrane is **selectively permeable**, which means that some substances can pass through while others cannot. Oxygen, food molecules, and waste products all must pass through the cell membrane.

Substances that can move into and out of a cell do so by one of three methods: diffusion, osmosis, or active transport.

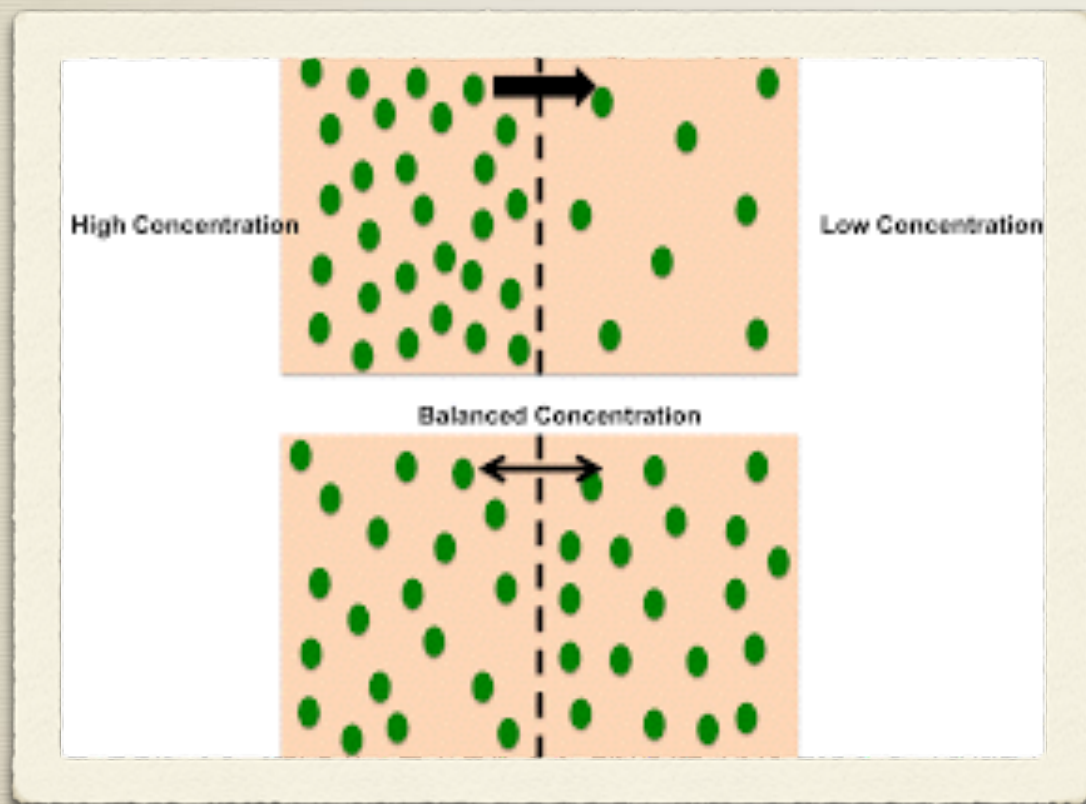


# Diffusion

Diffusion is the main method by which small molecules move across the cell membrane.

**Diffusion** is the process by which molecules tend to move from an area of higher concentration to an area of lower concentration.

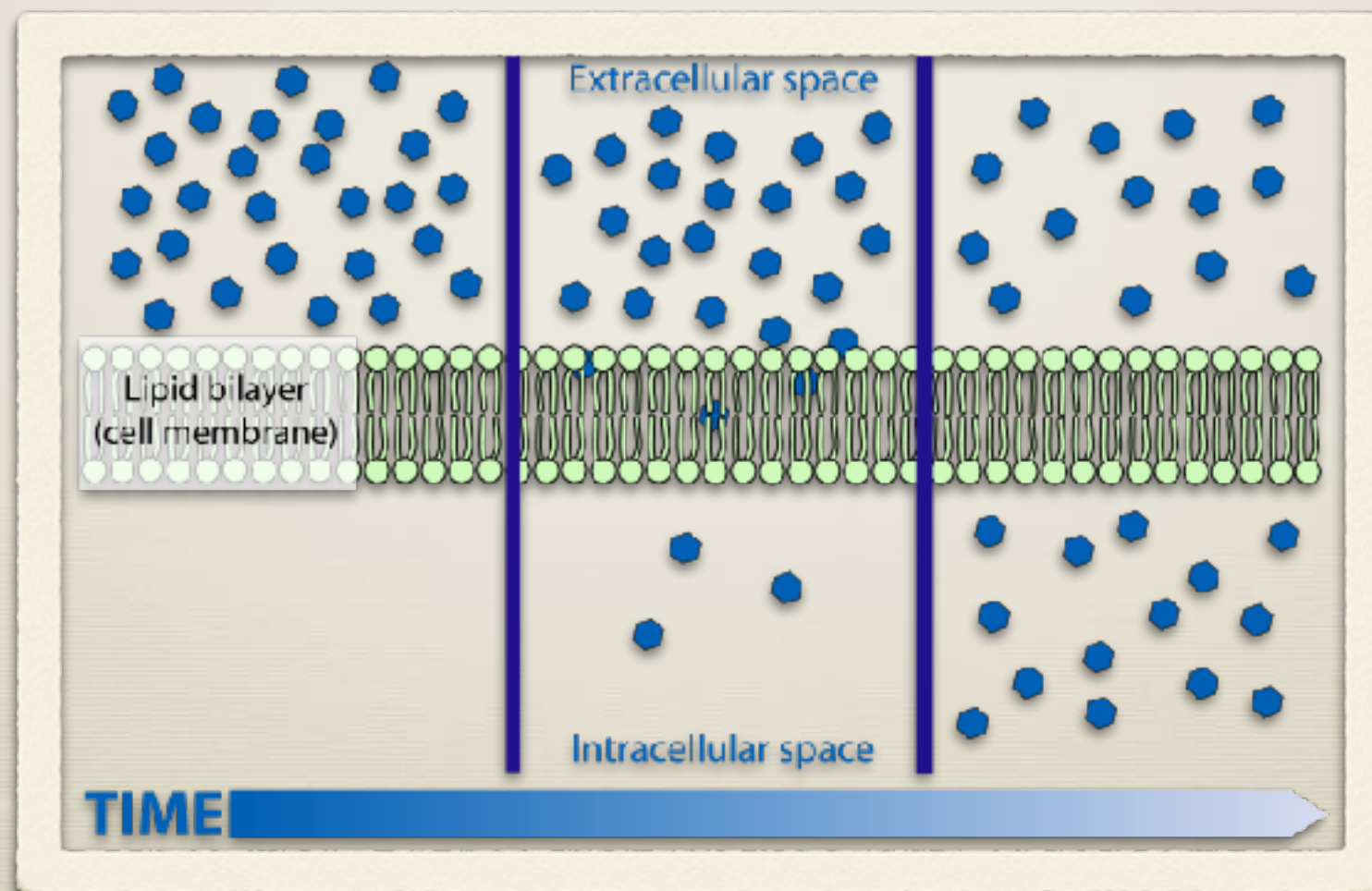
The concentration of a substance is the amount of the substance in a given volume. For example, suppose you dissolve 1 gram of sugar in one liter of water. The concentration is 1 gram per liter.





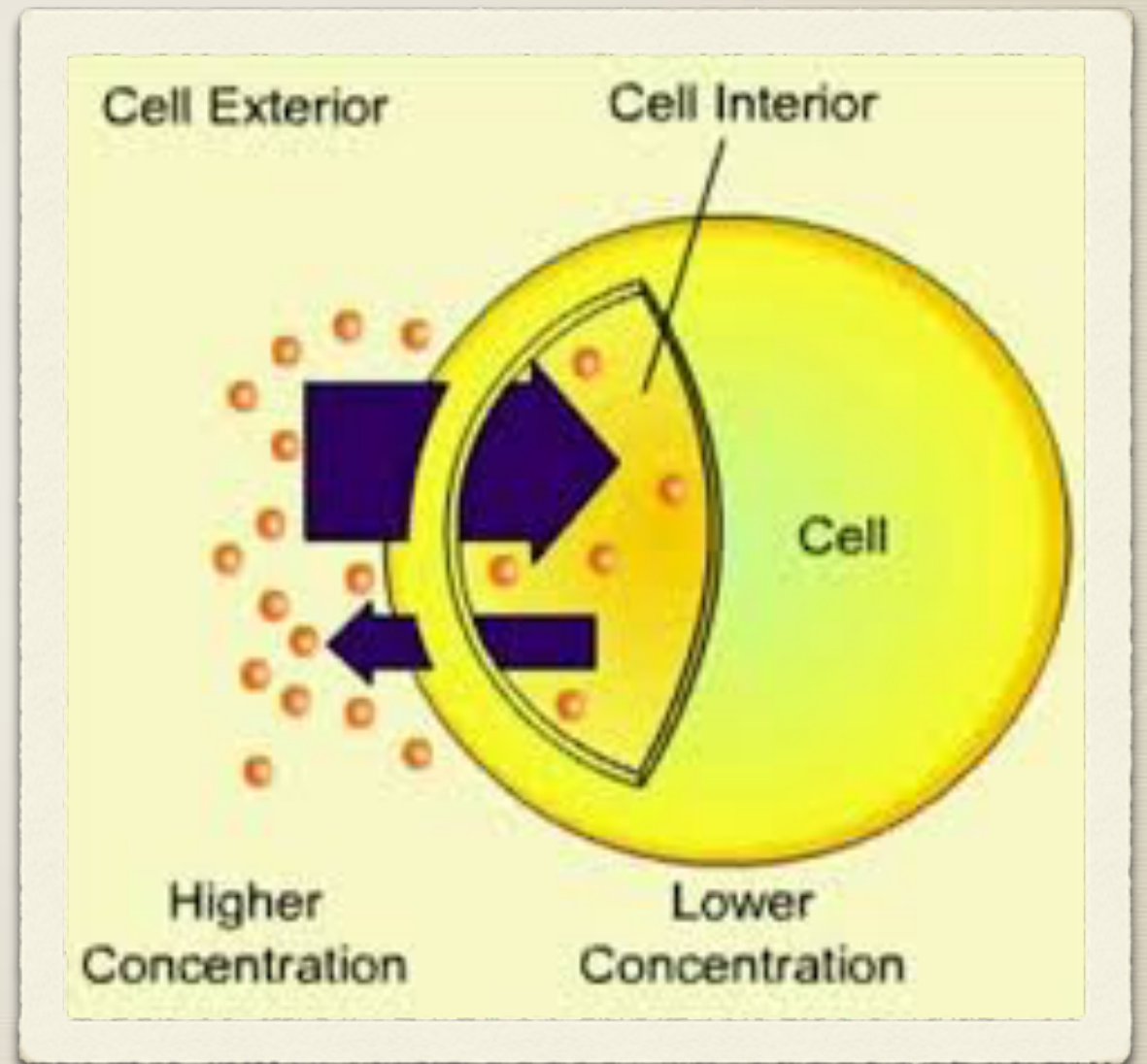
# Causes of Diffusion

Diffusion is caused by molecules moving and colliding. The collisions cause the molecules to push away from one another and spread out.



# Diffusion of Oxygen

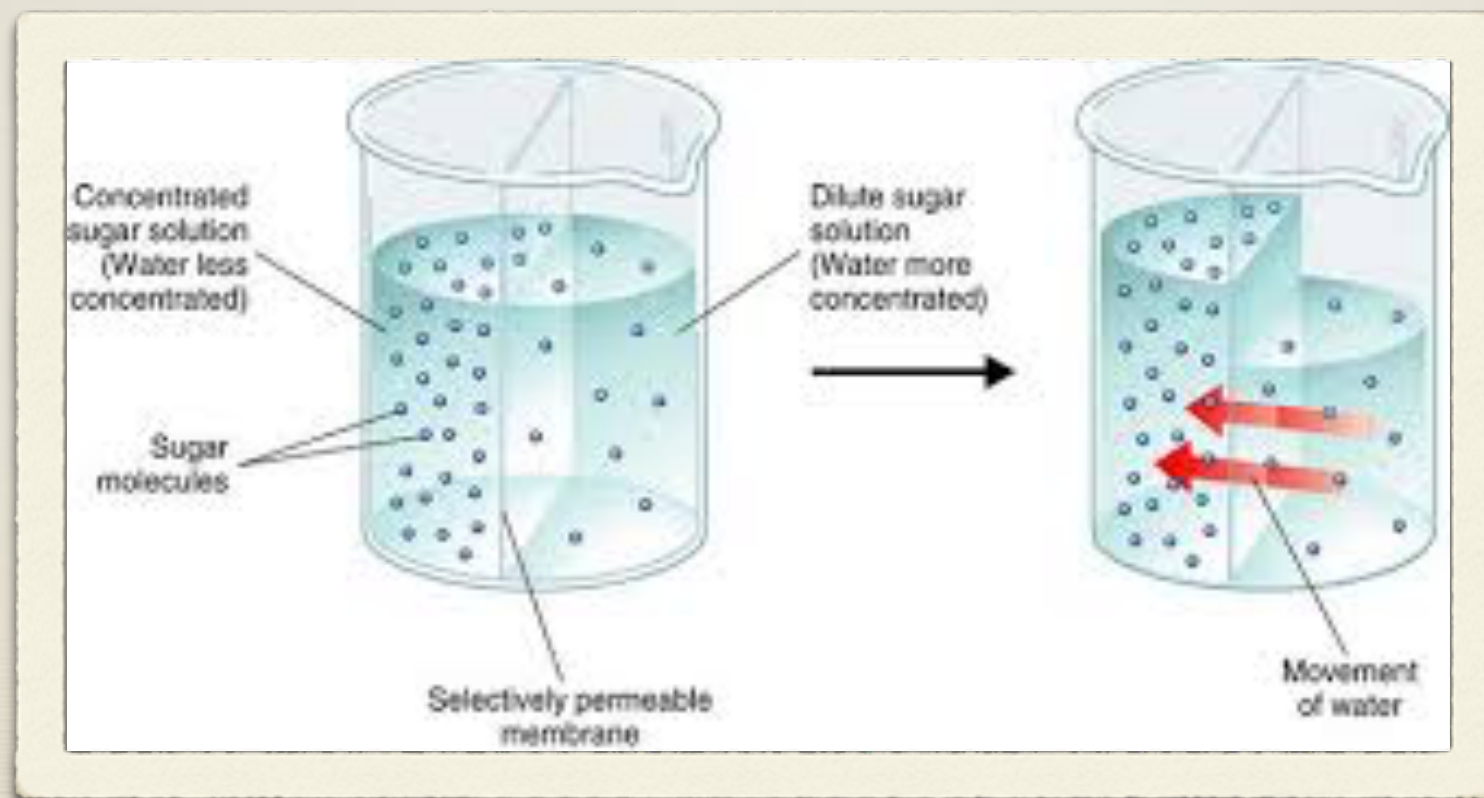
Molecules like oxygen diffuse through the cell membrane into the cell when there is a higher concentration of molecules outside the cell, (such as pond water) to the area of lower concentration, (the inside of the cell).





# Osmosis

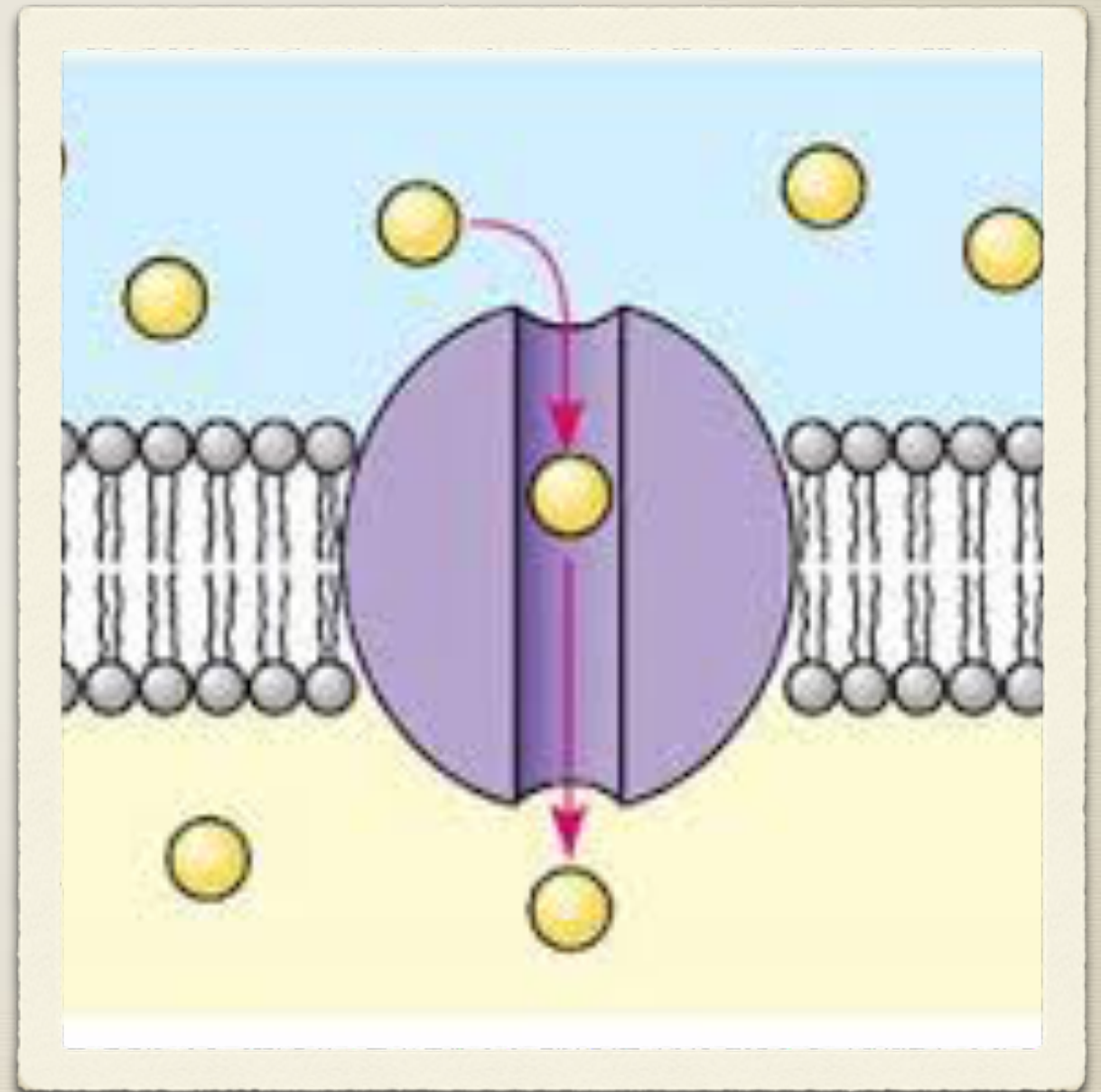
The diffusion of water molecules through a selectively permeable membrane is called **osmosis**. Because cells cannot function properly without adequate water, many cellular processes depend on osmosis.



In osmosis, water molecules move by diffusion from an area where they are highly concentrated through the cell membrane to an area where they are less concentrated.

# Passive Transport

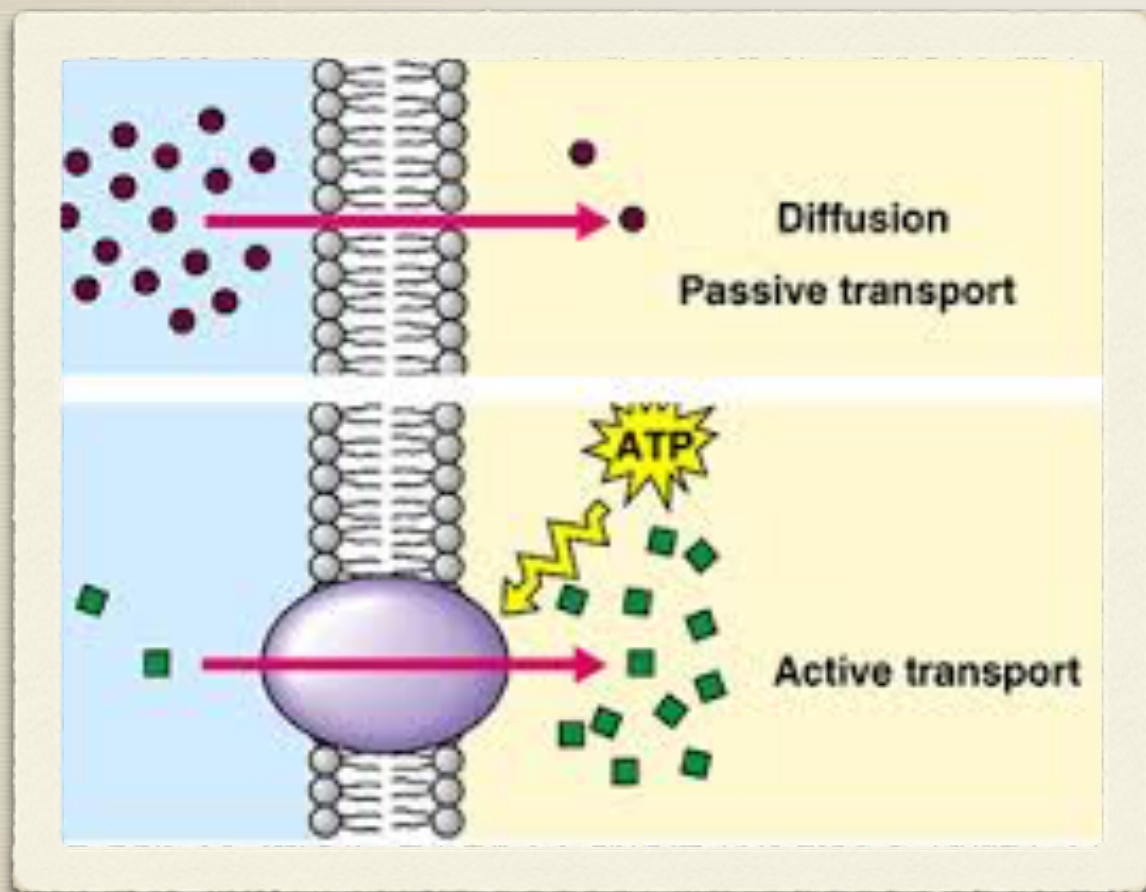
The movement of dissolved materials through a cell membrane without using cellular energy is called **passive transport**. Diffusion and osmosis are two types of passive transport.





# Active Transport

When a cell needs to take in materials that are in higher concentration inside the cell than outside the cell, the movement of the materials requires energy. **Active transport** is the movement of materials through a cell membrane using cellular energy.

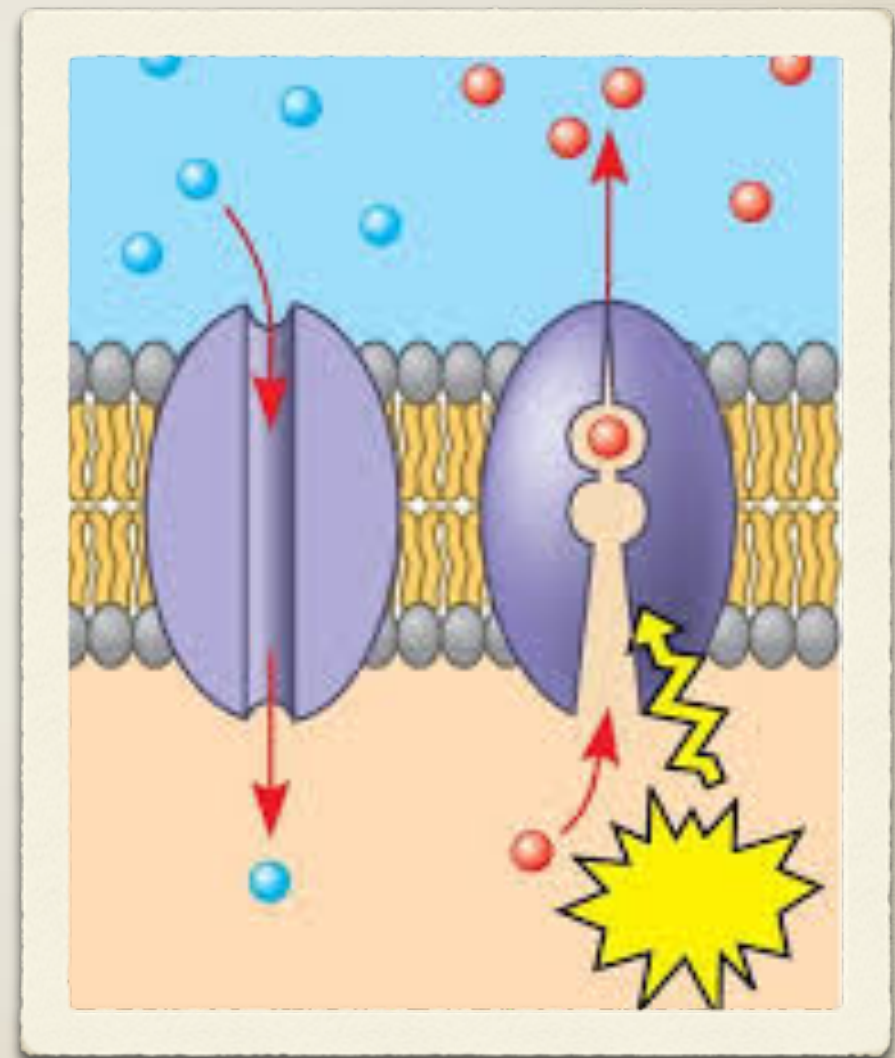


The main difference between passive transport and active transport is that active transport requires the cell to use its own energy while passive transport does not.



# Transport Proteins

Cells have several ways of moving materials by active transport. In one method, transport proteins in the cell membrane “pick up” molecules outside the cell and carry them in. They also carry molecules out of the cell in a similar way.



# Engulfing



Another method of active transport is **engulfing**, in which the cell membrane wraps around, or engulfs, a particle and forms a vacuole within the cell. The cell must use energy in this process.

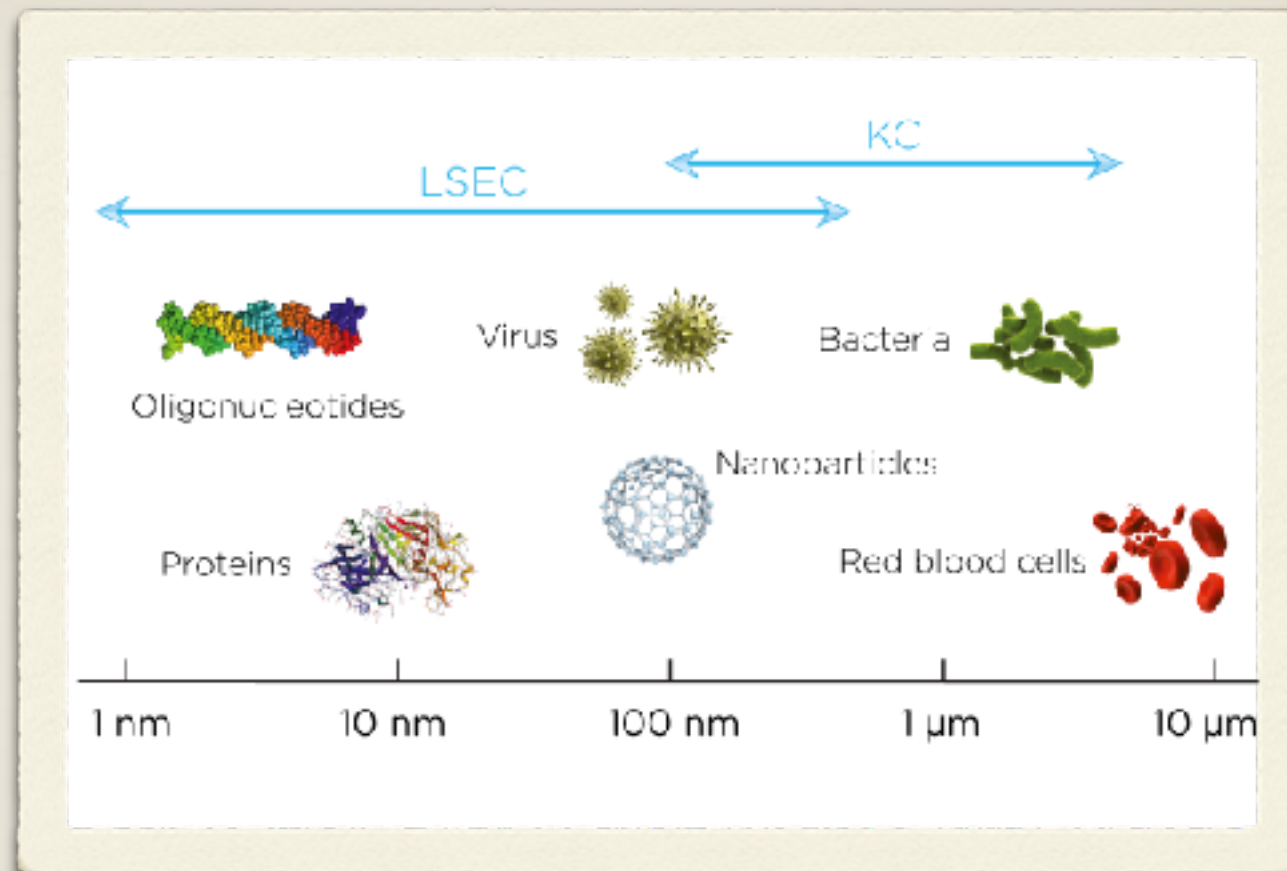


# The Size of Cells

Most cells are very small. One reason is related to the fact that all materials move into and out of cells through the cell membrane. Once a molecule enters a cell, it is carried to its destination by a stream of moving cytoplasm.



In a very large cell, streams of cytoplasm must travel farther to carry materials from the cell membrane to all parts of the cell. As a cell's size increases, more of its cytoplasm is located farther from the cell membrane.



It would take much longer for a molecule to reach the center of a very large cell than it would in a small cell. Likewise, it would take a long time for wastes to be removed. If a cell grew too large, it would not function well enough to survive.



# Keywords: English - Spanish

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Osmosis - Ósmosis

Active Transport - Transporte Activo

Engulfing - Engullir